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UNIDO PROGRAMME ON CLEANER INDUSTRIAL PRODUCTION

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Summary

Describes the UNIDO programme on cleaner industrial production with particular emphasis on the joint UNIDO/UNEP programme of National Cleaner Production Centres (NCPCs), its objectives and implementation approach, draws attention to the need for worldwide implementation of cleaner production and emphasizes the importance of international networking in the promotion of the concept.

Contents

		Paragraphs	Page
Introduction		1 - 4	4
I.	CLEANER INDUSTRIAL PRODUCTION	5 - 7	5
II.	THE NEED FOR ACTION	8 - 10	5
III.	UNIDO ACTIVITIES IN CLEANER INDUSTRIAL PRODUCTION	11 - 21	6
	A. Policy level: ESID strategies	12	7
	B. Institutional level: capacity-building programmes	13 - 14	7
	C. Enterprise level: demonstration programmes	15 - 16	8
	D. National Cleaner Production Centres	17 - 21	9
IV.	OUTLOOK	22 - 30	10
	A. International networking	22 - 25	10
	B. A world-wide cleaner industrial production policy	26 - 30	12
V.	CONCLUSIONS	31 - 34	13

Introduction

1. Industrialization is a cornerstone of socio-economic progress and a crucial engine of economic growth, especially in developing countries. In the past, the selection of technologies and industry components was based mainly on financial considerations with a view to maximizing economic output and practically little, if no, input as regards environmental issues was included in the planning process. This lack of concern for environmental matters has led to serious pollution and toxification of our planet's elements of air, water and earth.

2. Technologies presently used in developed countries show that industrial development can be well harmonized with environmental and habitat demands. The development of appropriate policies and of environmentally friendly technologies, as well as the implementation of industrial standards have contributed to this harmonization. Ecologically sustainable development implies that financial feasibility is analysed only after taking health, safety and environmental concerns into consideration.

3. Although the situation has generally improved, financial interests are still often overwhelming, especially in developing countries. The challenge faced by developed and developing countries is to change industrialization patterns by shifting to environmentally friendly technologies, reducing end-of-pipe treatments and increasing the recycling of materials. The reduction of industrial pollution by means of cleaner production has been identified as the key to ecologically sustainable industrial development. This is why cleaner industrial production, which improves environmental quality and often enhances profitability, can foster economic activity and offer new opportunities to industrialization. New incentives and an increase in competitiveness are elements frequently associated with process improvements. Those elements are also inherent in ecologically sustainable development and demonstrate that environment is not against business but creates new possibilities through the introduction and enforcement of better technologies and management systems.

4. In the face of pollution resulting from industrial production, the role of the United Nations Industrial Development Organization (UNIDO), as a specialized United Nations agency, is to provide assistance to developing countries to help them achieve an ecologically sustainable development of industry. Cleaner industrial production is an important element of the UNIDO environment programme since 1990. This concept was endorsed by UNIDO Member States in the conclusions and recommendations of the Conference on Ecologically Sustainable Industrial Development (ESID), held by UNIDO in 1991, and was accepted by the 1992 United Nations Conference on Environment and Development (UNCED) as one of the primary tools for industry to achieve environmental improvements while remaining competitive and profitable.

I. CLEANER INDUSTRIAL PRODUCTION

5. Cleaner industrial production is an integrated preventive strategy applied to processes and products in order to increase efficiency and reduce risks to humans and the environment. For production processes, cleaner production includes the efficient use of raw materials, water and energy, the elimination of toxic or dangerous materials and the reduction of emissions and wastes at the source. For products, the strategy focuses on reducing negative impacts - by appropriate product design - along the entire life cycle of a product, from raw material extraction to the ultimate disposal of the product.

6. One of the misconceptions among industries in developing countries has been that environmental protection is a cost-incurring activity and cannot be sustained without non-productive cash outlays. This notion has often led to weak implementation of environmental strategies and lack of conviction among the implementing authorities. However, there is growing evidence that waste minimization not only helps to reduce pollutant discharge by as much as 25 to 50 per cent, but that it also can be a profitable business decision. Cleaner industrial production often results in economic improvement to the process, the benefits being further enhanced when the manufacturer has to face pollution charges or the cost of dealing with waste through treatment or disposal. In addition to this economic incentive, cleaner industrial production is a preferential instrument to meet legal requirements and avoid penalties, or to build a corporate policy to improve the image of the company and to obtain public support to industrial development.

7. Furthermore, cleaner industrial production requires a shift in thinking away from end-of-pipe treatment of industrial pollutants towards prevention altogether. The techniques and technologies for cleaner production go beyond the technologies for pollution abatement and waste disposal: they embrace inside-the-factory changes in operating procedures, input materials, process technologies, onsite recycling and even products themselves. A new generation of technologies and processes is being developed by which the "clean" concept is approached in the research and development stages and constitutes the future manufacturing system. However, until this new manufacturing system is in place, cleaner production applied to present manufacturing systems is the immediate answer to sustainable development, as it will also enhance the learning process which will, in turn, speed up the shift to new environmentally sound technologies.

II. THE NEED FOR ACTION

8. Despite the advantages of cleaner industrial production and a growing interest from developed and developing countries, there are some barriers that prevent or make its worldwide implementation difficult. Major barriers to the implementation of cleaner production are lack of knowledge of the appropriate technology, lack of technical expertise in the methodology of process assessment and diagnosis, lack of financial resources, lack of awareness and resistance to new ideas. Other major barriers are government policies and regulations that focus on single-medium pollutant reductions and those that offer incentives for investment in end-of-pipe technologies.

policy, institutional and enterprise levels, UNIDO supports National Cleaner Production Centres.

A. Policy level: ecologically sustainable industrial development (ESID) strategies

12. Existing government policies often encourage the excessive use of resources by incorrect pricing or subsidies, or they assign preference to traditional end-of-pipe pollution control over pollution prevention. UNIDO is working with a number of countries in the preparation of ESID strategies that are aimed at formulating government policies and programmes that promote cleaner production as an essential element of sustainable development plans. These efforts include reviews of existing industrial, environmental and technology policies in order to identify those policy components that discourage cleaner production and to formulate alternative, proactive policies that encourage cleaner production.

> *An example of UNIDO activities at the policy level is the International Conference on Economic Growth with Clean Production, which was held jointly by the Commonwealth Scientific and Industrial Research Organization and UNIDO at Melbourne, Australia, in February 1994. Representatives of Governments as well as of industry and scientific and technological institutions participated in three days of debate and discussion during which practical approaches to ecologically sustainable industrial development were identified. Cleaner production issues specific to 12 industries, including leather, textiles, mineral-processing, metal-finishing and mining, were discussed in detail in separate workshops within the framework of the Conference. A set of 10 guiding principles for the achievement of sustainable development was drawn up by the Conference. These, the Melbourne Principles, emphasize, as prerequisites to the achievement of an ecologically sustainable industrial development, the importance of cooperation between Governments, industry and research institutions in both developed and developing countries.*

B. Institutional level: capacity-building programmes

13. Capacity-building and transfer of technology are given major attention by UNIDO. The expertise accumulated by UNIDO through years of experience is now being introduced in a set of guidelines to be used in plant audits and assessment of cleaner technologies available. Furthermore, UNIDO recognizes the importance of well-trained, fully equipped and well-informed public- and private-sector institutions promoting cleaner industrial production and therefore provides institutional support and information about cleaner production to governmental and non-governmental organizations.

14. For instance, to create permanent awareness and to strengthen human and institutional capability to respond to ecologically sustainable development issues, UNIDO has set up a self-learning training course in kit form. Its main component, a manual with distinct learning units, covers: the need for ecologically sustainable development and its definition; cleaner

production; analytical tools for identifying cleaner production opportunities; economic techniques for cleaner production; the role of Governments in environmental management; how to obtain information about cleaner production and how to incorporate environmental considerations into project design.

Activities at the institutional level include support for cleaner production programmes within environmental management agencies. Among others, UNIDO is working on such a project with the Central Environment Authority of Sri Lanka. It is building the capacity of the Authority to use waste-reduction measures as the first step in achieving industrial compliance with environmental norms, and is also providing seed money from a revolving fund for low-cost cleaner technologies. UNIDO is starting a similar project with the environmental authority of Nepal.

C. Enterprise level: demonstration programmes

15. UNIDO supports individual sectors that are interested in introducing cleaner production programmes into their activities. Support in the transfer of cleaner technology covers, in particular, the following industries: leather and leather products, agro-industries, wood products, textiles, chemicals, pharmaceuticals and biotechnology, pulp and paper, metallurgy and engineering and machine tools. Specific projects or programmes at the national or regional levels are carried out with emphasis on resource efficiency (chemicals, water, energy and raw materials), pollution prevention, waste recovery and recycling measures as a primary objective and effluent treatment/pollutant treatment as an adjunct measure. Some recently completed activities are in the cement sector in Egypt and the cane sugar sector in Mexico. A demonstration in the metal-finishing sector is currently under way in Pakistan.

16. UNIDO is also committed to ensuring that gender issues are carefully considered in the process of shaping the concepts of sustainable technology. Women entrepreneurs in small-scale industries are typically using old, inefficient, polluting and unsafe machinery. The challenges to supplying women with improved access to cleaner technologies are very similar to those of increasing their access to technology in general. UNIDO databanks provide businesswomen in the manufacturing sector with information on cleaner production and conducts training programmes, workshops and awareness raising campaigns related to cleaner production methods. UNIDO projects to improve local environments have a strong community focus, to empower local women, and provide them with new techniques and technologies, for example in waste management or recycling.

At the enterprise level, UNIDO activities include a project in India, "Demonstrations with Small Industries of Reductions in Emissions and Wastes" (DESIRE), carried out in cooperation with the National Productivity Council of that country. UNIDO has supported demonstrations of the potential of waste minimization in three sectors: agro-based pulp and paper; pesticide formulation; and textile dyeing and finishing. The 12 participating plants implemented 210 options with an investment of approximately $300,000 which, in turn, resulted in monetary savings of approximatley $3 million. In the case of the pulp, paper and textile sectors, there was a significant reduction in the

volume of water used and organic matter discharged into the environment. In the case of pesticides formulation, there was a significant reduction in toxic fugitive emissions and health hazards risk.

In the field of pesticides, a large percentage of women, especially in developing countries, are involved in the production, handling, transportation and actual application of pesticides. UNIDO has been implementing a comprehensive programme to assist developing countries in tackling this problem through the promotion of clean technologies, low volume, low risk, and environmentally friendly pesticides.

D. National Cleaner Production Centres (NCPCs)

17. As a cost-effective, policy-providing, sustainable capacity-building and demonstration effort, UNIDO, in cooperation with the United Nations Environment Programme (UNEP), has launched a new programme to support National Cleaner Production Centres. The Centres are meant to play a coordinating and catalytic role in cleaner production by providing technical information and advice, stimulation and demonstration of cleaner production techniques and technologies as well as training industry and government professionals. The programme will build capacity to develop and implement cleaner production strategies at the national level and will support NCPCs in approximately 20 countries for five years, after which they will be expected to be self-sufficient.

18. To promote the programme, UNIDO and UNEP are working with industry-oriented institutions such as national productivity councils, chambers of commerce, industrial Non-governmental Organizations (NGOs) and technical universities. NCPCs are located at, and supported by, existing institutions and are managed by experienced nationals of the countries concerned. NCPCs will serve as focal point for cleaner production with the following aims:

- Promotion of the cleaner production concept at the policy, institutional and enterprise levels;
- Organization of demonstration projects in industrial establishments;
- Conducting audits for industrial emissions and wastes;
- Dissemination of information on cleaner industrial production and facilitation of appropriate technology transfer;
- Production of technical publications;
- Training in cleaner production practices;
- Identification of obstacles, and provision of solutions, to the implementation of cleaner industrial production techniques and technologies;
- Collection of information on experience gained by NCPCs for storage in an information management system for exchange with other NCPCs and provision to programme management for wider distribution.

19. During 1995, eight NCPCs were set up in the following countries:

Africa: United Republic of Tanzania and Zimbabwe
Asia: China and India
Latin America: Brazil and Mexico
Central and Eastern Europe: Czech Republic and Slovakia

20. UNIDO/UNEP support will be provided to the centres for a three-year period and will include demonstration projects at selected industrial sectors, training, expertise and services of national and international consultants as well as information material on cleaner industrial production.

21. During the biennium 1996-1997, high priority will be given to the expansion of the NCPC programme. Based on solicitations received from existing industry-oriented institutions, UNIDO/UNEP will preselect the institutions as possible hosts for the establishment of NCPCs. Subsequently, one to three representatives of each potential host institution will attend a one-month training programme in Europe. Finally, UNIDO/UNEP will jointly select the final host institutions for NCPCs.

One already existing NCPC, the China National Cleaner Production Centre, was set up at the Chinese Research Academy for Environmental Science. IVAM Environmental Research, Netherlands, was contracted as the counterpart institution to assist in training and demonstration activities. The core activities of the Centre will consist of two industry-sector demonstration projects in the non-wood pulp and paper industry (approximately six participating mills) and in breweries (at least two participating enterprises). Additional activities will be undertaken to establish an institutional framework for the promotion of cleaner production in China, including, but not limited to, establishing regional and/or industry sector cleaner production training and technical cooperation centres.

IV. OUTLOOK

A. International networking

22. The potential of promoting cleaner production and implementing successfully the concept depends on how well the goals of cleaner industrial production can be reached. These goals consist of a three-step process: integration of cleaner production in the industrial management systems, followed by demonstration projects and, finally, dissemination of the results. The three steps are explicated below.

Integration: The primary goal, the integration of cleaner production considerations into all aspects of standard industrial practice, is the most significant indicator of the penetration of cleaner production techniques and technologies. Only then will cleaner production become

a sustained, continuous effort to reduce the source and pollution intensity of existing as well as new processes and products. Taking this criterion into consideration, cleaner production programmes have not yet fully met this goal. There has been only limited penetration of the preventive approach into standard industrial practices and industrial support institutions.

Demonstration: The next step in the promotion of cleaner production is the implementation of in-plant demonstrations that exploit the readily available source reduction measures for existing processes and products and that can inspire a small number of "innovative" enterprises to implement similar measures. In-plant demonstration is the best instrument to convince many experts who are sceptical about the potential for changing the entrepreneurial culture, particularly in small and medium enterprises in developing countries.

Dissemination: Once the industrial production concept has penetrated all aspects of standard industrial practice and demonstration projects have been carried out to obtain a multiplier effect, the results of these efforts have to be disseminated to a large number of plants in the industrial sector. The present capacity of information systems should be used, completed and expanded to disseminate the concept. In an effort to contribute to this important issue, UNIDO collects information and available expertise on cleaner industrial production worldwide, to complete its present information system and to disseminate the information to interested institutions, Governments and individuals, especially through the National Cleaner Production Centres.

23. The implementation of the concept therefore calls for the participation of Governments, governmental and non-governmental organizations, business, and many other groups as well as individuals at the international, national and local levels.

24. To reduce wastes, Governments have to change their policies and emphasize pollution prevention as a first priority. Intergovernmental organizations should coordinate their action and promote the concept in their specific fields of activity. Non-governmental Organizations, in particular technical and environmental institutions, could be important promoters of the cleaner production concept at the international, regional and national levels. They have an important role to play in diffusing this concept, by putting pressure on policy makers and by helping to change attitudes, especially in small and medium enterprises.

25. Within the United Nations system, UNIDO is the only organization with extensive work experience within the manufacturing sector. UNIDO promotes cleaner production to satisfy the new demands of society and the needs of developing countries. It can bring to the field of cleaner production both its internal cross-sectoral and subsectoral expertise and use its field network to monitor and assist demonstration projects and National Cleaner Production Centres. It contributes to the implementation of cleaner production by incorporating applied information systems for an effective use of computer technology that promotes safe and cleaner industry. Finally, UNIDO can draw on its network of experts, both the methodology of cleaner production assessments and knowledge of subsector process options for reducing wastes and optimizing the manufacturing processes.

B. A world-wide cleaner industrial production policy

26. Sustainable development is a multidimensional concept with a number of interrelated aspects including ecological, environmental, economic, technological, social, cultural, ethical and political dimensions. A sustainable future of our planet will require shifts in personal values, beliefs, attitudes and goals, as well as substantial changes in economic, social and political practices.

27. Environmental concerns, both at the global and national levels, have attracted the attention of the public at large and emerged at the forefront of the international policy agenda over the last two decades. With the adoption of Agenda 21 by UNCED in 1992 and the conclusion of several conventions, the world community has a very comprehensive international policy statement on the need to attain ecologically sustainable patterns of development. Agenda 21 has profound implications for industry and industrialization patterns as it stresses the need to ensure the protection and conservation of environmental resources in the most cost-efficient manner.

28. Pollution and toxification of the environment have been identified as a major issue but have not yet received a proportionate international response in the form of a convention or a legal agreement. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal is the single international treaty addressing the issue of toxic chemicals. However, it focuses on controlling transboundary movement and the disposal of hazardous wastes and does not address the need for a global effort related to the prevention of pollution and toxification which is left to the parties of the convention. At the time being, cleaner production - which should be playing this important role - is not supported by any specific agreement or convention.

29. The situation is partly due to varying perceptions of the public of the need for cleaner industrial production. Pollution and toxification of our environment by unsound production systems are very often perceived as local rather than global problems. The time has come to correct this limited perception. The harmful impacts from substantial deposition of pollutants and chemicals have so far been relatively limited because most ecosystems - soils, sediments and wetlands - have the capacity to store and immobilize toxic chemicals for a long period of time. Once the ecosystem reaches its capacity to store pollutants, the unexpected and sudden release of chemicals and pollutants will have harmful effects on our environment. As many sources of water become increasingly polluted and natural soils unusable for agricultural cultivation, population migration in search of habitable areas will follow, leading to instability, at both the national and the international levels.

30. It is expected that world population and per capita income will further increase in the future. As industrial production is a driving force in the increase of per capita income, every attempt has to be made to reconcile economic growth with ecologically sustainable development.

V. CONCLUSIONS

Cleaner industrial production is an immediate need for industry.

31. Cleaner production represents an immediate and urgent need for industry until a new generation of technologies and processes takes over from the present manufacturing systems. New technologies will help to introduce environmental concerns at the research and development stages, but a full package of innovative technologies will not be available for several years.

This preventive approach has not been given enough attention as compared to other environmental issues.

32. Meanwhile, cleaner industrial production is the best way to cope with many environmental issues. UNIDO experience shows that waste can be easily reduced at the source, at no cost, or with a payback period of less than one year. Even those industries that have already incorporated end-of-pipe solutions for pollution control have a real interest in applying cleaner production. Furthermore, cleaner industrial production can act as a driving force in revising the manufacturing system that can enhance the benefits achieved through production.

UNIDO promotes cleaner production through the integration of the concept into management systems, demonstration projects and dissemination of results.

33. Once the principle of waste minimization is integrated into all aspects of standard industrial practice, and the implementation of in-plant cleaner production demonstrations and the dissemination of their results are achieved, cleaner production will be widely accepted as a sustainable and continuous effort to reduce industrial production waste. Cleaner production represents the most efficient means in efforts to limit potential damage to the environment emanating from today's technologies and, at the same time, to achieve sustainability while stimulating industrial development. It is the role of Governments, intergovernmental and non-governmental organizations as well as individuals to join efforts in the implementation of the concept.

Cleaner industrial production needs adequate financing, especially for small- and medium-sized industries. A global funding system would help to prevent the foreseen social and environmental problems resulting from industrial pollution.

34. After the demonstration has been made of the universal importance of cleaner production, the establishment of a funding system similar to the Montreal Protocol on Substances that Deplete the Ozone Layer, or the inclusion of the cleaner production concept in a present funding system such as the Global Environment Facility (GEF), is essential. A global fund would represent a significant acknowledgement of the responsibility for individual countries to join in a combined effort for the common good.

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THE ROLE OF INDUSTRIAL BUSINESS ASSOCIATIONS IN CLEANER INDUSTRIAL PRODUCTION AND IN SUPPORT OF CLEANER PRODUCTION ACTIVITIES*

Prepared by

the International Network for Environmental Management

*The views expressed in the present document are those of the authors and do not necessarily reflect the views of the UNIDO Secretariat. This document has not been edited.

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Preface

The International Network for Environmental Management (INEM) aims to minimize the environmental impacts of industrial activities and to help industry and business reconcile the imperatives of development and environment. INEM draws on the concrete experience of members to show how to implement pro-active environmental policies that are compatible with market success. INEM promotes a holistic approach to environmental management into business culture, operation and methods and places special emphasis on small and medium enterprises and industries in developing countries.

INEM actively promotes the concept of cleaner industrial production both directly and indirectly through the enabling environment it fosters, and through the motivation of management it creates all over the world. INEM provides a platform where cleaner production centres can exchange information with their peers in environmental management associations and where the complementary approach can be combined for greater synergies.

Contents

		Paragraphs	Page
Introduction		1 - 2	6
I.	WHAT TYPES OF INDUSTRIAL BUSINESS ORGANIZATIONS ARE RELEVANT AND WHICH SHOULD WE FOCUS ON	3 - 7	6
	A. Definitions	3	6
	B. Defining parameters and types of associations	4 - 6	6
	C. Relevance of each association type to CP	7	7
II.	BARRIERS TO CP IN INDUSTRY	8 - 20	7
	A. Barriers from the psychological point of view of the manager	8 - 10	7
	B. Other important barriers	11 - 12	8
	C. Small-scale industries	13 - 15	9
	D. Raising the demand for CP	16 - 20	9
III.	HOW CAN BARRIERS TO CP BE OVERCOME	21 - 46	10
	A. Analysis of barriers in more details	21 - 29	10
	B. Relevance of Productivity Centers and Chambers of Commerce	30 - 32	12
	C. Environmental management: a key element	33 - 35	13
	D. Cooperation of CP centres with environmental management associations	36 - 40	14
	E. Towards a virtuous circle	41 - 46	14

		Paragraphs	Page
IV.	A FEW SUGGESTIONS TO PROMOTE CP PROGRAMMES	47 - 56	15
	A. For Governments and donors	47 - 51	15
	B. For public and private research centers	52	16
	C. For international organizations and information providers	53 - 56	16
V.	SUMMARY OF MAIN POINTS		17

Annex

INEM approach to EM and CP with a programme of activities that reconciles fundamental business and environmental objectives and values 19

Introduction

1. This paper is based on the experience of several business associations and after consultation with Cleaner Production Centres all around the world. It addresses the issues systematically, stating definitions and simplifying assumptions to allow maximum clarity. We will first define industrial business associations and determine to what extent similar recommendations can be drawn for each subtype. The reason to differentiate between types of organization is because restricted resources force us to allocate these resources in the most efficient way, to try to implement the most effective division of labor strategy between organizations to avoid wasteful overlaps. We will then analyze problems presently preventing the greater use of Cleaner Production (CP) in industry, and try to see the role of business organization in solving these problems.

2. We show that the problems can be solved by raising the demand for CP, and we make proposals to raise the demand for CP, by linking CP to the implementation of environmental management (e.g. EMAS/ISO 14000). Finally, we end with recommendations for different institutions.

I. WHAT TYPES OF INDUSTRIAL BUSINESS ORGANIZATIONS ARE RELEVANT AND WHICH SHOULD WE FOCUS ON?

A. Definitions

3. How do we define industrial business associations? All types are to be distinguished from purely technical/professional associations, mostly composed of individuals (e.g. engineers and accountants, both key professions for CP), which are dealt with in another document. The membership of the business organizations are in general companies themselves, though in some cases, they are top management representatives in their personal capacity.

B. Defining parameters and types of associations

4. There are two independent parameters which we may use to make useful distinctions: whether an association has a sectoral focus or not, and whether the association deals mainly with environmental issues or not. This is shown in Table 1. Also indicated are typical examples of specific business organizations at each intersection.

5. We exclude organizations which are both sectoral and have a more restrained mission, for example on specific legal issues, because these are too narrow. We also exclude those business associations focusing only on narrow environmental aspects, e.g.. packaging. In general, their role is not relevant to CP except as general stimulus of environmental awareness in business.

Table 1

Examples of relevant types of industrial business associations

	Sectoral	Non-sectoral
Environmental focus	e.g. IPIECA - International Petroleum Industry Environmental Conservation Association (Type I)	e.g. INEM - International Network for Environmental Management (Type II)
General focus	e.g. ICA - International Chemical Association (Type III)	e.g. ICC - International Chamber of Commerce (Type IV)

6. To avoid national specificities, we give examples of each type on the global level (i.e. the organization which represents its type globally, rather than nationally or regionally). Each type has its national committees or affiliated national organizations. This does not affect the analysis or its conclusions. For more convenient reference, we number them by type:

Type I = sectoral + environmental focus	e.g. IPIECA
Type II = non-sectoral + environmental focus	e.g. INEM
Type III = sectoral + general focus	e.g. ICA
Type IV = non-sectoral + general focus	e.g. ICC

C. Relevance of each association type to CP

7. We cannot lump all these different types of business organizations in one. It would not be helpful to restrict ourselves to considering only one or two of the above types. All these types exist, and all have as members industrial companies which need CP. Further, though so far only few actively support CP, all publicly support the philosophy behind CP. All are needed in the spread of the concept and benefits of CP in industry, if only for general awareness.

II. BARRIERS TO CP IN INDUSTRY

A. Barriers from the psychological point of view of the manager

8. We can classify the main problems preventing the implementation of CP as follows, in the order in which they appear. For example when a lower-level problem is solved, the next one on the list becomes dominant. Note that the list has been designed from the psychological point of view of a manager of industry.

Table 2

Barriers to CP from the point of view of the manager

1. Lack of general consciousness/awareness about the relevance of environmental protection in business, "Environmental Protection has no relevance to my business".

2. Lack of detailed knowledge about the specific benefits of CP, "What real benefits can this Cleaner Production stuff bring me?"

3. Lack of belief in the benefits in spite of the knowledge, "I don't believe all these wonderful stories you tell me. This is only for rich foreign companies!"

4. Lack of neutral, credible, and cheaply available information on how to implement CP once a decision has been made to act, "Where do I get good and credible information on how to implement this?"

5. Lack of finances once the needed information has been collected. "I don't have money even to make that small investment".

9. Each one of these stages is a step in a hierarchy . It is useful to visualize these steps as a linked chain, because different type of organizations can help to alleviate the problem at different stages. Stage 5 applies after the "low hanging fruits" have been harvested, i.e. when low-cost or no-cost performance improvements through improved housekeeping have been exhausted. Experience from Norwegian, Dutch and USA programmes show that up to 30% improvements can be made with no or minimal investments.

10. In general, experience shows that it is more productive to emphasize positive economic aspects of CP rather than environmental aspects.

B. Other important barriers

11. Two major barriers are missing from the previous table because they do not easily fit in the linear psychological model, and are relevant to all stages. The first is the **lack of economic incentives** and the second the **lack of qualified people for CP and CP assessment.**

12. When resource prices do not reflect real costs, there are less specific benefits of CP, though even then, for a factory which uses less resources and produces less pollution, CP is a powerful incentive. In this case, the strongest incentives may come from the visible and positive human health effects which CP brings as it reduces dusts, gases, volatile organic chemicals and other emissions, as well as reduces sick time,. etc.

C. Small-scale industries

13. It is important to remember that all problems mentioned above are magnified when companies are small. In general, business associations tend to be financed and dominated by big companies, while the biggest problems in implementing CP, for a variety of well known reasons, are encountered in small-scale industries (SSIs). So we are justified in asking: **Can a big business organization solve problems associated with small ones?**

14. The answer that a big company is a collection of small companies forgets the advantages which such "small-within-larger units" have in being able to call upon resources (financial, managerial etc.) from another part of their larger mother company.

15. We should therefore use as a key criterion to evaluate potential solutions whether these and their implementing agencies are able to help SSIs, as indeed is the goal of UNIDO NCPCs, even if they often start with big companies.

D. Raising the demand for CP

16. The key indicator which will tell us when the problems of lack of awareness, lack of knowledge on benefits, and lack of belief are solved, and which will solve the problems of lack of credible information and accessible finances, is the "demand" factor. If there is a market demand for CP (and fair competition), then other elements will fall into place.
So the problem becomes : **HOW DO WE RAISE THE DEMAND FOR CP?**

17. This becomes a second key criterion which we must use to evaluate the role and usefulness of different associations. The third criterion is how cost-efficiently associations fulfill other criteria, and the last is to what extent a multiplying/leveraging effect is achieved.

18. To maximize human and financial efficiency of CP programmes, we propose to use the criteria in table 3. Organizations should be evaluated as to their ability to fulfill each criteria, and a different cooperation strategy of NCPCs and UNIDO should be used with each type of organization, to allocate resources most efficiently through a division of labor. The results of this process should lead to the most efficient partnerships that promote CP, and most importantly, how to maximize the chances of CP programmes surviving after initial funding expires, and how to ensure that CP concepts are spread throughout the industry of each country, especially within SMEs.

19. It seems that in general, the associations with environmental focus are more suited to spreading CP ideas, because they focus on promoting environmental awareness in companies, and thus directly or indirectly raise the demand for CP. Because of this focus, there is also less scope for potential "interference" from other goals of the organization, eg political, economic, or trade union bargaining issues, and therefore more credibility for the targets.

20. On the other hand, the environment committees of general associations are key allies in spreading the message to a broader layer of companies, at least at an introductory level.

Table 3

Criteria to evaluate cooperation strategies towards different business organizations in promoting CP

1. **MAXIMIZE DEMAND FOR CP**: to make CP concepts sustainable

2. **MAXIMIZE OUTREACH POTENTIAL FOR CP**: to make CP concepts used by small companies and industries

3. **MAXIMIZE DISSEMINATION EFFECT**: maximize highest multiplying/leveraging effect

4. **MINIMIZE COSTS**: maximize synergies and cost-efficiency

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III. HOW CAN BARRIERS TO CP BE OVERCOME ?

A. Analysis of barriers in more detail

21. Let's examine now each barrier in more detail, and which association types are best suited to help lift specific barriers.

Lack of general consciousness/awareness about the relevance of environmental protection in business

22. More and more, this lack is being addressed, though principally still in OECD countries or in large companies. In general, all business actors can contribute to this, as it is a very general condition. This condition is also addressed by pressures of the public, clients, consumers, environmental NGOs, and by legal or market requirements (e.g. for export). To quote Allen

Morley, Managing Director of the Australian Centre for CP: "Business associations are a vital component of the cleaner production and awareness process."

Best suited associations: All types, either directly or through their environmental committees

Lack of detailed knowledge about the specific benefits of CP

23. This is a "technical" requirement, and cannot be dealt with efficiently by the general associations. It should be done by the CP centers, and additionally by environmental focus associations. So far, a body of knowledge has been created but is not standardized, it is in different places, and not readily available. CP bodies are the first repositories of such knowledge but business organizations can act as multiplicators of the information.

Best suited associations: Types I, II and environmental arm of others

Lack of belief in the benefits in spite of the knowledge

24. This problem is one of the trickiest, and is often related to the fact that people only really believe if the examples presented are from similar companies close to home. No Indian manager will care that 3M has saved a billion dollars with CP, but they will care if their peer saved a few thousands. As Mr. Chandak, Director of the NCPC India expresses "There must be locally applicable CP information available . If not, it must be prepared."

Best suited associations: Type II (EM associations) because of their experience in convincing local companies about the benefits of implementing EM.

Lack of neutral, credible, and cheaply available information on how to implement CP once a decision has been made to act

25. This is another crucial point. Often, companies fear that a so-called CP consultant may in fact be a disguised sales agent for a company, and may sell them the most expensive equipment, rather than the cheapest for the job, just to increase their commission.

26. Further, there is a need to deliver CP information in very many different ways, not restricted to the usual goals to deliver information electronically, though all delivery mechanisms should be ultimately based on a very strong and efficient computer database.

Best suited associations: mainly Type II, EM associations for the same reasons as above. Such associations are also neutral rather than mainly lobby tools.

Lack of finances once the needed information has been collected

27. One of the big problems up to now has been that some CP programmes are given just enough funding to start, and succeed in "wetting the appetite" of the participating companies, but when it comes to obtaining funds to invest, none is available. Quoting Natalia Ladoutko, Director of the Latvian Pollution Prevention Center: "Some of our Latvian companies wanted to invest in equipment after being convinced of the benefits but they were told that no funding was available for that purpose".

28. A solution is to combine such centers into a broader EM association using the CP center as its core. In the above case, the Latvian centre is the core of the national Latvian environmental management organization, and will be supported by the international network for environmental management.

29. Another solution is to spread schemes to finance CP for SMEs, like for example the scheme of the small French bank Banque Populaire du Haut-Rhin, which without losing any money lends loans at 6% repayable over 3 years to small companies for environmental improvement investment (too often still end-of-the-pipe rather than CP) for a maximum of about 60,000 US$.

Best suited associations: Consortia of banks and environmental management associations through internationally standardized programmes .

B. Relevance of Productivity Centers and Chambers of Commerce etc.

30. In some cases, Productivity Centers can overlap both the functions of CP centers and of EM associations. This is not a problem, as existing Productivity Centers can serve as the basis for CPC (as was done in India), or even for EM associations (as the Taiwan Productivity Center). The only problem which may arise is if there are several centers in the same country. Then agreements must be made to avoid duplication and overlap, except in a deliberate way.

31. Finally, the environmental advisers who work in some Chambers of Commerce or Industry Federations are themselves not in the position of helping companies directly, but should guide incoming requests to the associations and centers. This means that they themselves should know exactly about the existence of the EM and CP bodies, and the latter should build up and nurture a good relationship with the national apex business body.

32. Sector associations in general are requested by CP bodies to cooperate in introducing and promoting CP in their sector (see table 4).

Table 4

Demands for CP centres with respect to sectoral associations

Sectoral associations should work together with the local CP center to promote CP training in their sector.

Sectoral associations should spread information and success stories about CP in their sector.

Sectoral associations should inform NCPCs about the CP needs and in particular the training needs for CP in their sector.

Sectoral associations should encourage the people in their sector who have been trained to share their experience with their peers in future training.

C. Environmental Management: A Key Element?

33. CP without environmental management is not sustainable. The reason for that is clear: CP does not work without management commitment. And CP, which has clear environmental benefits, as Mr. Chandak, Director of the NCPC India very clearly stated when speaking about management motivation: "The primary condition for CP is management commitment". Similarly, Mr. Vladimir Dobes, Director of the Czech CPC says: "Lack of commitment at the top management level is a barrier to CP", or Prof Blazej, Director of the Slovak CPC: "There is no chance to implement anything if it is not under the auspices of top management. The goal should be to use CP as a step to attain integrated environmental management."

34. CP is just one element, albeit a very important one, but which must be combined with other elements of a integrated strategy which includes human resources, marketing, finances etc. The necessity to combine the management side with CP is expressly recognized by CP centres.

35. The broadest yet at the same time still useful operational definition of Sustainable Development for most companies is the concept of environmental management. CP is too narrow a concept and more general socio-ethical considerations are still too theoretical for the vast majority of companies.

D. Cooperation of CP centres with environmental management associations

36. Overall, we can see that though in general, nearly any association can distribute information, the best suited partners to raise the demand are environmental management associations. Many cleaner production centers are associated with national EM organizations. Other centers are becoming the platform for new environmental management associations (e.g. Latvia).

37. Certain demands expressed by CP centres to business organizations are the core activity of environmental management associations. To again quote Vladimir Dobes, of the Czech CPC: "Industrial business associations should promote ISO 14000 and stimulate enterprises to include CP as the main aim of EMS". Or Mr. Chandak of NCPC India: "ISO 14000 is an area which NCPCs should use to promote the demand for CP".

38. EM associations may provide ideal "one-stop-shops", as requested in the United Nation's Agenda 21, where CP centers can exchange information with their peers in environmental management associations, and where complementary approaches can be combined for greater synergies.

39. Therefore the most important reason in general why CP centers should cooperate with EM associations is that through their normal activities, **environmental management associations raise the demand for CP.**

40. Cooperation with EM associations also answers the concern that business associations in general are lobbying institutions, as EM associations concentrate on the practical implementation of EM in companies, rather than on defending specific economic interests of companies.

E. Towards a virtuous circle

41. Let us address the two remaining problems identified earlier, i.e. the lack of qualified CP experts and a macro-economic framework conducive to CP.

42. Raising energy and resource prices in many countries amounts to political suicide. One way to allow this is to spread the benefits of CP enough that the savings attained make it politically feasible to diminish subsidies in a step-by-step fashion. If these steps are clearly announced long enough in advance, the knowledge of this will raise the demand for CP, or at least can be used by proponents of CP to sell their product.

43. A greater demand for CP leads to greater savings and therefore to the political possibility of implementing the next step in the reduction of subsidies. In that way, a virtuous circle can be started. **This virtuous circle should be the policy goal of all governments, and should be the main incentive for them to support CP.**

44. Secondly the lack of qualified experts will be slowly remedied by the increasing demand. In the meantime, training of local experts should be promoted, but these should be trained regularly together with their colleagues in other countries as well, or at least be given the opportunity to exchange their experiences and know-how with their peers.

45. By raising the demand for improved environmental performance in industry, environmental management associations also raises the demand for such experts.

46. So we finally arrive at a two prong strategy for making CP programmes sustainable, i.e. a strategy which fulfills the criteria of promoting CP concepts in industry of all sizes and all sectors, with the highest efficiency in terms of human and financial resources. (More general conclusions and recommendations are made in the summary points at the end of the paper.)

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TWO PRONG STRATEGY FOR MAKING CLEANER PRODUCTION SUSTAINABLE

FIRST PRONG

IN GENERAL, COMBINE CLEANER PRODUCTION BODIES WITH ENVIRONMENTAL MANAGEMENT BODIES TO BENEFIT FROM SYNERGIES AND MOTIVATION

THIS WILL FUNCTION AS THE MAIN NATIONAL RESOURCE AND CENTRE OF EXCELLENCE IN THAT COUNTRY

SECOND PRONG

USE NETWORK OF OTHER INSTITUTIONS FOR BROAD PROMOTION AND DISSEMINATION OF CP CONCEPT AND EXAMPLES (SECTORAL ASSOCIATIONS, CONSULTANTS, ACADEMIC INSTITUTIONS ETC.)

****

IV. A FEW SUGGESTIONS TO PROMOTE CP PROGRAMMES

A. For governments and donors

47. In general, NCPCs emphasize the need for greater public support: from India: "In order to make CP a widely accepted reality, an explicit political willingness is needed on the part of the government to support and pursue CP vigorously", and Australia: "National governments have a crucial role in promoting and, where appropriate, assisting industry in the adoption of CP"

48. A particular point is the follow-up financial support needed to establish a CPC. For example, the Czech CPC could only expand its activities, after the initial project supported by the Government of Norway, because it was integrated into the UNIDO/UNEP network of National Cleaner Production Centres. This example is fortunate but in many cases, support is not sufficient. For example, support does not include funding for international travel to other centres, or to meet other centres.

49. Governments and donors should support close cooperation of CP centres with EM associations, including on a case-by-case basis expanding the scope of CP centers to include environmental management.

50. Governments and donors should support participation of their own national CP centers or of those whom they finance in the INEM Partnership Exchanges, where they additionally meet and network with their colleagues from environmental management associations from all over the world.

51. Also, there should be a better follow-up once the programme has started and when companies look for funding to implement measures. Examples from the Czech Republic and Latvia show that good CP measures are not always implemented because of lack of investment financing.

B. For public and private research centres

52. Public and private research centres should enter into partnership with CP centers to promote a two-way exchange:

- CP centers should inform research centres of real needs of industry
- research centres should inform CP centres of their latest discoveries to accelerate their development to market ready processes and products.

C. For international organizations and information providers

53. Accurate, reliable and cheaply available information is the lifeblood of a CPC. This is why IGOs and other information providers on CP should strive to provide free or reduced price access to information to NCPCs.

54. As a start, the results of the UNEP/UNIDO survey of sources of information should be widely distributed free of charge to all Environmental Management, Cleaner Production, Pollution Prevention and Waste Minimization associations and centers around the world.

55. It is beyond our scope to evaluate the reliability or usefulness of existing technological information systems for CP, but at least one thing has been established by INEM, it is that few people know about the existence of the different information providers, or about the previously mentioned survey.

56. In general, IGOs, donors and international financial institutions (IFIs) can accelerate the spread of CP by requiring the implementation of environmental management in all projects financed, including CP as a vital sub-component.

V. SUMMARY OF MAIN POINTS

GOALS

1. INCREASE DEMAND FOR CP

CONDITION 1: RAISE MANAGEMENT MOTIVATION

RECOMMENDATION 1 : COMBINE ENVIRONMENTAL MANAGEMENT AND CLEANER PRODUCTION STRATEGIES

CONDITION 2: IMPROVE ECONOMIC INCENTIVES

RECOMMENDATION 2: CREATE POCKETS OF SUCCESS THROUGH SUCCESSFUL APPLICATION OF EM AND CP.

2. IMPROVE ENABLING ENVIRONMENT FOR CP

CONDITION 1: IMPROVE HUMAN RESOURCES

RECOMMENDATION 1: PROMOTE TRAINING OF MULTIPLICATORS

CONDITION 2: IMPROVE INFORMATION RESOURCES AND DISTRIBUTION

RECOMMENDATION 2: PIGGYBACK ON ENVIRONMENTAL MANAGEMENT INFORMATION SYSTEM, USE BROAD NATIONAL NETWORK OF MULTIPLICATORS

CONDITION 3: IMPROVE FAIR ACCESS TO FINANCING FOR CP

RECOMMENDATION 3: PROMOTE INNOVATIVE FINANCIAL MECHANISMS, ESPECIALLY FOR SMEs/SSIs

Other recommendation:

Promote internationally standardized contracts whereby experts or consultants are paid a percentage of the savings, rather than a percentage of sold equipment (whether they are paid for their time should be decided on a case-by-case basis).

Annex

INEM APPROACH TO EM AND CP WITH A PROGRAMME OF ACTIVITIES THAT RECONCILES FUNDAMENTAL BUSINESS AND ENVIRONMENTAL OBJECTIVES AND VALUES

1. Set out a new philosophy of industrial development with the target of low/zero-waste and low/zero-pollution by the year 2020, and promote the local and national organizations to achieve it with EM and CP.

2. Develop, promote and introduce CP as "normal" for every industrial production that business can expect to operate after the year 2000.

3. Start with a cooperative effort between: SMEs, larger enterprises, multi-nationals, governments and trade associations to set up INEM-type industry associations for EM and CP in every country, to

- introduce CP and other EM measures in member firms as part of the continuing development of an integrated system of EM;
- propagate the findings of joint experience and discussion;
- inform the general public truthfully of these activities;
- influence the development of an economic framework providing greater incentive to enterprises to exercise EM and CP in their own financial interest;
- offer members workshops, seminars, presentations and forums on EM/CP;
- create educational material for the special needs of SMEs everywhere;
- initiate and coordinate research and pilot projects;
- promote training schemes for EM and CP;
- supply members with regular information through an information service;
- cooperate with business associations, chambers of commerce, trade unions, government agencies, environmental associations and even active NGO's;
- cooperate with sister associations in other countries through INEM;

4. Encourage major companies to support national EM associations, whether they are members or not, by

- supplying specialized speakers for workshops, seminars and forums;
- sponsoring and conducting pilot and demonstration EM projects;

- making non-confidential know-how available to the association;
- permitting use of their organization, means of communication and world-wide contacts, for international surveys into environmental technologies;
- raising the demand for environmentally preferable products and services through specific "green" procurement policies;
- using their market position and financial power in conformity with the interests of the association;
- deliberately assisting member SMEs along the lines of "the strong help the weak";
- requiring foreign subsidiaries to support their local EM association.

5. Motivate competent government and administrative bodies to support the establishment and operations of EM associations by

- taking un-bureaucratic action to remove any administrative barriers to the establishment and operation of such an association;
- recognizing the association as beneficial to the community in the existing tax laws and in getting privileged fiscal treatment;
- supplying it with personnel for which it does not have to pay if the country has a job creation programme offering such possibility;
- providing financial support for, or initiating, congresses, research projects or pilot projects;
- respecting the association's independence in pursuance of its statutory aims;
- encouraging state-owned enterprises or services (post office, railways, water works, electricity and gas companies etc.) to join the association;
- ensuring that the above enterprises and institutions, and public authorities, conduct their materials management with the purchase of environmentally benign products and the reduction of hazardous waste in mind;
- influencing the general economic framework such that enterprises harming the environment suffer heavier financial penalties, whilst environmentally sound attitudes are better rewarded.

6. Get private and public foundations and other charitable organizations, to give moral and financial support to EM associations.

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THE ROLE OF NON-GOVERNMENTAL PROFESSIONAL/TECHNICAL ASSOCIATIONS AND ORGANIZATIONS IN CLEANER PRODUCTION*

Prepared by

the International Union of Technical Associations and Organizations (UATI)

*The views expressed in the present document are those of the authors and do not necessarily reflect the views of the UNIDO Secretariat. This document has not been edited.

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Preface

The International Union of Technical Associations and Organizations (UATI) was created on 2 March 1951 at the initiative of UNESCO and enjoys consultative status with UNIDO. Its mission is to bring together non-governmental international technical associations and professional organizations operating on an international scale.

UATI coordinates the activities of its member associations and facilitates relations between these associations and the United Nations organizations. It promotes industrial manpower development and exchange of technical studies and information.

UATI functions like an "umbrella" organization. Its orientations are set out by its technical committees, of which there are six (Environment, Advanced Techniques, Technical and Economic Development, University-Industry, Communication and public works). Each technical committee includes several working groups responsible for studying and setting concrete projects; their lifetime varies according to their objectives.

Contents

		Paragraphs	Page
I.	THE ROLE OF PROFESSIONAL/TECHNICAL NGOS IN INDUSTRY	1 - 18	5
A.	The role of NGOs in environmental management and pollution control	6 - 13	6
B.	The role of NGOs in cleaner production: preventive action	14 - 18	7
II.	LIMITS TO CLEANER PRODUCTION	19 - 21	8
III.	PROPOSALS TO OVERCOME MANAGERIAL AND TECHNOLOGICAL BARRIERS	22	9
IV.	THE ROLE OF UNIVERSITIES AND TRAINING	23 - 27	10
V.	CONCLUSION	28 - 29	10

Annex

Examples of concrete actions in cleaner production carried out by national and international professional/technical NGOs 11

I. THE ROLE OF PROFESSIONAL/TECHNICAL NGOS IN INDUSTRY

1. The role of Professional/technical NGOs, as outlined by the role of UATI or its member associations, is to promote technologies, to lend its support to large-scale programmes, to conduct demonstration projects followed by full-scale projects, to mobilize the technical potential of its members in order to launch projects concerning the sustainable development of countries for the benefit of the populations therein.

2. Professional/technical NGOs are also a forum for meetings and exchanges among the scientific communities, universities and high-level engineering schools, engineers and industrialists. They are attentive to the needs and proposals emanating not only from the United Nations organizations and its member organizations but also from external bodies: States, through their ministries (Industry, Health, Environment); universities, through their own committees, such as the Industry/University Committee; associations, from both industry and civil society.

3. The role of a Professional/technical Organization, as an NGO, is therefore to ensure that every aspect of each problem is taken into consideration, free of any vested interest. This is fundamental in environmental matters, within a growth-oriented policy, to make sure that there is no formal contradiction between a liberal line of thought and an interventionist line of thought. It is important, however, that an environment-oriented economic logic be determined and firmly established in development choices at a world-wide level, so as to enable governments to integrate them into their structures.

4. In the case of UATI, its thirty-one Member Associations work in a similar way with their own working groups in order to bring about concrete achievements in this or that sector. The advantage of this way of operating is that, for a given subject and at a given level, industrialists, laboratory workers, researchers and engineers can get together in a common process of reflection, thus making it possible to pose the problem correctly, look for the most suitable solution, analyze it and possibly test it and then set out the terms of reference for its implementation.

5. Some associations, because of their specialized membership, have come to be poles of expertise, and they act as focal points where preoccupations of all kinds converge, providing an opportunity to study common problems, to search for solutions applicable to all, or at least transposable, and to exchange information in an atmosphere of trust and cooperation. We have the example of one such association, concerned with energy saving problems, which comprises 1400 experts and some 80 research committees and groups of experts.

A. The role of NGOs in Environmental Management and Pollution Control

6. Professional/technical NGOs have both the knowledge and the ability to contribute to the development of Environmental Management and Pollution Control Systems and of the necessary production tools, as well as to the dissemination of that knowledge and to the corresponding technology transfer. Their technical expertise is also required to adapt know-how to the different socio-economic conditions for its transfer to developing countries.

7. At the policy level, the mission of these NGOs is not to decide on the regulations but to put forward recommendations based on scientific and state of the art technologies.

8. For the development of Environmental Management programmes, they have at their disposal experts of high-quality and wide experience to implement simple methodologies following the classical procedure: an audit, a progamme of action, a basic guide document containing recommendations, a training programme and assessment procedures.

(a) The audit

Once a particular problem of industrial pollution has been well defined at company level, the audit cannot simply content itself with solving it. It must also tackle the problems up- and downstream of the production process. The upstream part consists of raw materials and components; the downstream part is represented by the products;and the whole transformation system operates -- thanks to energy and consumable fluids. This transformation process results in solid, liquid and gaseous waste; however, explaining, for example, that a better combustion yield can improve certain waste products is not always easy and can be misunderstood, whereas it is in fact beneficial from all points of view -- lower energy consumption, lower costs, less polluting waste.

(b) The programme of action

The diagnosis established following the audit should enable the major issues to be identified, in particular the managerial issues, and bring an awareness of the importance of interaction between the different activities for the protection of the environment. The programme of action that is then drawn up should list the actions to be undertaken, establish priorities, formalize orientations and define the different stages of the actions to be taken to control environmental problems.

(c) The guide

The process will then involve producing a guide document describing the practices and measures to be implemented at the organizational level for cleaner production and at the managerial level to ensure the protection of the environment.

(d) The training programme

Once the objectives have been defined, the priorities selected and the hierarchy of technical means well established, a training programme can be drawn up. It is important that the programme should involve as many members of the company's staff as possible so as to ensure the best possible dissemination of knowledge on

protection of the environment based, in particular, on on-site experiments and analyses and on managerial concepts in the field of environmental protection.

(e) The assessment procedures

Finally, assessment procedures must be established in order to ensure that all the actions, both technical and managerial, have in fact been implemented and that the measures undertaken really do correspond to the objectives set.

9. Direct appeal to corrective actions, commonly noted as end-of-pipe treatments, have been the major response to pollution control in the past. Present procedures for permanent assessment will help to encourage the preventive approach of cleaner industrial production.

10. Identification of pollution sources is obtained through regular measuring of the typical environmental parameters. It is important, however, that the instruments for carrying out such measurements should be developed and improved in order to qualify manufacturing processes over time. In this way, the company's environmental management approach should develop with the emergence of a "Mr. Environment", alongside "Mr. Security" and "Mr. Quality".

11. The problem is not posed in the same terms in large companies as it is in small or even medium-sized firms. Whereas in the former there is a "Mr. Environment" who deals with the environmental management of the company, the same is not true in small firms because of their size. Without actually disregarding the problems, they do not pay sufficient attention to them. NGOs must, therefore, increase their capacity in order to be able to also target such firms. Of course, small-company managers do attend technical exhibitions and participate in congresses, but this is not sufficient to question their manufacturing processes.

12. Technical associations, like ours, have followed this line of action in environmental management many times, and it has always served as an example and an encouragement for other firms to follow suit and to benefit in the same way.

13. Thus, it is normal in a certain number of industrial sectors (for example in energy, smelting works, glass works) to hold seminars (some of them roving), technical exhibitions, colloquiums, congresses, clubs, and factory visits, all devoted to the quality of the environment and to cleaner production (see annex).

B. The role of NGOs in cleaner production: preventive action

14. The investment needed for corrective action is contributing to accelerating the design of new manufacturing facilities intended for the implementation of more eco-efficient industrial processes.

15. But the lessons and experience drawn from such corrective actions rarely produce miracles, and it is essentially up to researchers and laboratories, with infinitely greater technical and financial means than those available to NGOs, to bring about radical

technological change leading to in-depth modifications in manufacturing methods that result in significant environmental gains.

16. Nevertheless, the Professional/technical NGOs can contribute towards facilitating the eventual adoption of new manufacturing processes by developing a global managerial approach whereby questions of quality, savings in energy and raw materials, waste minimization -- especially of hazardous waste -- as well as productivity improvement and working conditions can successfully be addressed.

17. The fact that research on, and the design of, new manufacturing processes -- it seems that no significant progress is expected for about 10 years -- is currently carried out by big industrial groups means that the application of any new process is limited to those companies that are able to acquire the patents for them. The Professional/technical NGOs do not have the direct means with which to help firms in this respect, except perhaps in negotiating such patents. Indirect action is taken through updating skills and/or knowledge of the professionals that have joined such Professional/technical NGOs. Also through the cooperation with universities, providing them with information on the needs for applied research.

18. Until these new manufacturing processes replace the present factories, cleaner production must be intensively applied in existing facilities. A clear role exists for Professional/technical NGOs in many aspects starting from knowledge transfer.

II. LIMITS TO CLEANER PRODUCTION

19. The limitations for action in cleaner production are not in the role that Professional/technical NGOs can play, but are essentially of a financial nature. When a project has been studied and in-depth, technical and economical feasibility studies have been prepared, it is possible to look for and obtain funding. If, however, an audit is to be made, which as we have seen involves the presence of high-level experts, the Professional/technical NGOs, like small firms, find themselves incapable of undertaking such a survey owing to lack of funding. Furthermore, NGOs wishing to associate representatives from developing countries with their working groups do not have sufficient financial means with which to cover their travel expenses; and there are also institutional limits.

20. Environmental problems must be approached differently in different countries, according to their wealth and to their environmental regulations. The size and dispersion of firms make it necessary for NGOs to approach problems differently. There is not always an appropriate national structure they can use to persuade a company manager that cleaner production does not necessarily mean more expensive production. Furthermore, Professional/technical NGOs sometimes experience difficulty in obtaining help, either from government authorities or national research and teaching bodies, to select a firm to become the reference firm. Once selected however, this pilot industry would have the advantage of being able to set up a training programme adapted to the newly-introduced techniques as well as a new approach to sales, in particular by developing exports.

21. Another limitation can come from the fact that NGOs in the South may have a different approach to environmental issues from those in the North; what the latter considers to be waste can for the former be called a resource, in particular in the case of urban waste management and the agro-industry.

III. PROPOSALS TO OVERCOME MANAGERIAL AND TECHNOLOGICAL BARRIERS

22. The following proposals could be instrumental in overcoming managerial and technological barriers in the implementation of the concept of cleaner production:

a) For Professional/technical NGOs to participate in actions to promote awareness of the concept of cleaner industrial production and in demonstration projects. For this, roving seminars can be very useful if they are organized in close collaboration with the relevant local authorities who take responsibility for operation follow-up.

b) To lend support to the creation and development of cleaner production centres, backed by UNEP/UNIDO.

c) To encourage the pooling of data banks set up by national and international technical associations in all major branches of industry (via Internet, for example).

d) To assist in the general dissemination of recommendations on cleaner production at international congresses, regional seminars and national workshops organized by NGOs.

e) To facilitate NGOs access to information concerning the needs expressed both by developing countries and by economies in transition in the field of cleaner production.

f) To provide financial assistance for preliminary surveys and for travel expenses for experts from both North and South.

g) That UNIDO should pursue the establishment of a funding system to implement cleaner production and to obtain greater flexibility in lending conditions for firms that have made the effort to meet environmental standards.

h) That UNIDO should intervene to attenuate the effects of too stringent a system of industrial ownership protection as regards developing countries.

IV. THE ROLE OF UNIVERSITIES AND TRAINING

23. Education and training play a fundamental role in the success of these in-depth behavioural and technological transformations. It is essential that the University be present in all its forms, and that closer links be established between industry and universities in general. In UATI's University-Industry Committee we have observed that such links are not only well under way but are actually accelerating, and that joint university-industry examination of the problems posed is most fruitful. We know of one example in which three years of continued effort and study have led to changes in 30% of the courses. Professors and researchers analyze the problems within companies while engineers and technicians review course curricula in order to modify and reorient them. This joint study has resulted in better oriented teaching where the theory takes all aspects of the problems into account, including their environmental dimension.

24. While student education and training ensures the future, specialized booster sessions, colloquiums, congresses and round table meetings can bring engineers and technicians up to date on the latest information and knowledge.

25. Ideally, company managers and financiers should be able to spare time to actively participate in these sessions in order to grasp all the information and gain an awareness of the irreversible significance of taking environmental issues into account.

26. This brief overview shows that Professional/technical NGOs are well aware of the fact that preventive strategies in environmental protection constitute a major element in a policy of sustainable development. Their mission is to try to change attitudes and modify behaviour, to disseminate information, to share knowledge and know-how, and to encourage the development of education and training.

27. They are ready to pursue, even to increase, their efforts in favour of education and training adapted to the specific needs of each country, insofar as they request it, and to set about defining strategies and programmes.

V. CONCLUSION

28. Industry must adopt a reasonable attitude, which is the basis for sustainable development. It must remain competitive while at the same time taking into balanced consideration economic objectives, suppliers, consumer expectations, and respect for the environment. It must be able to combine the past with the most recent technical knowledge and face up to continued population growth and increasing urbanization.

29. Professional/technical NGOs lend assistance to countries in order to ensure the development of more efficient and better balanced economic and social models. Their motto is that of Hubert Reeves:

"We must preserve industry which gives us our livelihood,
and the environment which gives us life."

Annex

SOME EXAMPLES OF CONCRETE ACTIONS IN CLEANER PRODUCTION CARRIED OUT BY UATI

Foundry Industry

A technical forum "Foundry and Environment" during the Foundry World Congress held in Sao Paulo.

Task forces on the following topics:

- Recycling of used sand by thermal, mechanical and other treatments
- General recycling possibilities for wastes in foundries

Survey of environmental problems in the various countries: waste management for which low cost solutions are being sought; odour problems, with organic volatile components leading to odour nuisances; the possible CO_2 tax.

Glass industry

Annual meetings including an intensive exchange of information on:

- New technologies for air pollution control for glass furnaces
- Furnace designs/operating conditions generating very low emission levels

Task forces directed to standardizing methods to determine flue gas emissions from glass furnaces. Round Robin tests for determination of fluoride, chloride, SO_x, NO_x, Selenium and particulate emissions have been carried out in order to validate and compare different methods.

Chemical industry

Task forces on different subjects such as:

- Decreasing the amount of waste and effluent by first treating toxic releases
- Methodologies for the restorations of polluted sites
- Guide on environmental management in industry by applying the 16 principles of the charter for sustainable development established by the International Chamber of Commerce.

Energy

Inventories on technologies for a cleaner coal combustion to produce electricity.

Materials and structures used in building and civil engineering

Technical recommendations of sustainable application of mineral raw materials in construction.

Recycling of different materials.

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THE ROLE OF ENVIRONMENTAL NGOS IN CLEANER INDUSTRIAL PRODUCTION*

Prepared by

Greenpeace International

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Preface

Greenpeace International is an environmental pressure group which started its activities in 1971. The organisation is not allied to any political party and acts independently of any government, business interest, group or individual. Greenpeace International is funded by donations from over 4 million people in 158 countries. It embraces the principle of non-violence and rejects the use of physical force against people or property.

Greenpeace International's involvement in clean production includes the organisation of a campaign against toxic trade in Central and Eastern Europe, mainly in Poland, tracking foreign aid and investment, exposing waste trade schemes, the transfer of misguided western technologies and unwanted products. Greenpeace International campaigns for the adoption of clean production (see report "Poland the Green Tiger and Europe? Clean Production -The Only Way Forward") by highlighting the opportunities for clean production that exist especially in countries with economies in transition.

Contents

	Paragraphs	Page
Introduction	1-7	6
I. WORKING WITH THE PUBLIC	8-44	7
A. Public Access to Information: The Key to the Implementation of Clean Production	14-15	7
B. The U.S. Toxic Release Inventory	16-18	8
C. The Pollutant Release and Transfer Register	19-20	8
D. Other Sources of Environmental Data	21-25	9
E. Public Education to Spearhead Change	26-30	9
F. Greenpeace Proposes Ecological Tax Reform	31-33	10
G. The Greenfreeze Campaign	34-39	10
H. Campaigning for a Chlorine-free planet	40-44	11
II. INTERNATIONAL NGO NETWORKING	45-75	12
A. Greenpeace Campaigns in Central and Eastern Europe	48-51	12
B. Waste Trade	52-54	13
C. Providing Remedies	55-59	13
D. The Waste Incineration Campaign - A Case Study in Global NGO Networking	60-75	14
Networking: North America - Western Europe		
Networking: North - South		

	Paragraphs	Page
III. WORKING WITH NATIONAL AND INTERNATIONAL INSTITUTIONS	76-83	16
IV. CONCLUSIONS	84-91	17
V. RECOMMENDATIONS		18

Annexes:

I. Clean Production Definition and Criteria		20
II. Terminology		21
III. Steps to Clean Production Steps to Eco-hell Where does your country stand?		22 - 24

Introduction

1. As the environmental movement in the West matures and environmental issues increasingly become part of mainstream government and industrial policies, so the role of the movement is changing. Environmental organisations today are not only exposing environmental problems but increasingly focusing on promoting alternatives.

2. Environmental problems are escalating. Most are caused by industrial production and consumption systems which squander resources - materials and energy - leading to their depletion and industrial emissions and waste. The unsustainable use of renewable resources and toxic substances in production processes reduces biodiversity and poses a threat to environmental and human health.

3. The response of governments to public pressure demanding action to stop further environmental degradation has been to set emission standards for various pollutants. Industry efforts, in turn, have focused on installing end-of-pipe technologies, such as filters and flue gas desulphurisation units, to achieve emission goals.

4. The continuing degradation of the environment has shown this "pollution control" approach to environmental management to be seriously flawed. Pollution has not been prevented, but instead has been moved between water, air and soil. For instance, contaminated filters are dumped in landfills where they poison both soil and, ultimately, groundwater.

5. Although much has been said about the need for sustainable development, strategies to get there have been poorly promoted, much less implemented. Greenpeace considers Clean Production to be one of the best developed strategies to provide the paradigm to put society on the path to sustainability by changing industrial practices worldwide.

The key elements of Clean Production are:

* precaution
* prevention
* democracy
* integration and holism
* environmental, social and economic cost-benefit analysis

6. The role of environmental groups is to keep the move toward Clean Production dynamic and on course. Progress toward this goal must be closely monitored to avoid another environmental cul-de-sac, such as the end-of-pipe approach of the 1970s.

7. The first part of the paper examines the role of environmental groups in working with the public. The second part highlights the importance of international NGO networking. The third section examines their role in working with national and international institutions. The paper ends with a series of recommendations both to governments and industry.

I. WORKING WITH THE PUBLIC

8. Public participation in political and economic decision-making is one of the cornerstones of the Clean Production approach. It challenges the right of industry and scientists to impose polluting production technologies and the locations to pollute.

9. Expanding global trade and investment renders transnational companies more mobile and national Governments less potent; so this may be a tall order.

10. However the situation is not hopeless. Controversy during the Brent Spar campaign about the amount of toxics being dumped failed to mask the real root of the problem - the environmentally damaging design of the oil storage buoy.

11. The campaign proved that the power of public pressure can stimulate the type of public debate that highlights and challenges Governments' right to allow companies to dump their waste in the global commons of the North Atlantic instead of insisting on environmentally sound design criteria. Public outcry at incidents like this will inevitably lead to demand for life cycle assessment of all industrial products and processes at an early stage of development, from oil platforms to nuclear power plants.

12. Another lesson for industry is that it is no longer enough for companies to rely on Government policymakers and regulators alone to ensure societal approval for environmentally controversial decisions. They now need to consult a growing range of environmental 'stakeholders'.

13. Brent Spar showed that companies taking difficult decisions can no longer count on each other to stay silent if their consciences dictate taking a stand. The campaign split Shell revealing a wide chasm in environmental awareness between Shell Germany and that in Shell UK.

A. Public Access to Information: The Key to the Implementation of Clean Production

14. Environmental groups and the public can have an increased input in decisions relating to industrial production when information regarding processes and products is readily available. One of the aims of the environmental movement worldwide is improved information disclosure.

15. The U.S. Toxic Release Inventory (TRI) illustrates the public empowerment that this can provide.

B. The U.S. Toxic Release Inventory

16. The U.S. Emergency Planning and Community Right to Know Act, of 1986, stipulates that annual reports of emissions must be prepared by companies which use, over a threshold quantity, any of the 300 plus listed chemicals. These reports, which make up the Toxic Release Inventory (TRI) are actively disseminated by the USEPA (US Environmental Protection Agency) to the public.

17. The USEPA has on-going input from the Working Group on Right-to-Know to evolve the TRI into a better tool. The US recently passed legislation to make the reporting of pollution prevention measures mandatory. Current US NGO lobbying is aimed at expanding the TRI to list a further 300 chemicals and also to have it changed to a Toxic USE Inventory which would provide information about hazardous chemicals in the products themselves.

18. Since the passage of the Act, industry, government and public groups have unanimously claimed its success. The effects are summarised below:

* *It has empowered communities by providing specific information about companies in their neighbourhoods, enabling them to gauge their performance.*

* *It has increased company accountability.*

* *The tracking of trends help groups to focus on why pollution prevention measures are not being used.*

* *TRI data on methods of source prevention has helped groups lobby for pollution prevention in a more credible fashion.*

C. The Pollutant Release and Transfer Register

19. The OECD is currently facilitating a series of workshops to establish a Pollutant Release and Transfer Register (PRTR), with the objective of creating an international register modelled on the TRI. The aim of the workshops is to prepare a "Guidance to Governments Document" on the design and implementation of a PRTR to be published in December 1995. This is in answer to Agenda 21's call for more public information on environmental emissions.

20. Environmental NGOs are taking part in this process. It is crucial that the PRTR does not focus on emission data only, but adopts mass balance accounting procedures (ie. what goes in must come out audit) similar to the New Jersey and Massachusetts toxic use reduction laws. Otherwise, cross-media transfer of toxins will escalate, and the goals of clean production will not be served.

D. Other sources of Environmental Data

21. Emission registers, however, are essentially reactive instruments. They examine only what comes out at the end of the pipe, rather than looking upstream in the production process.

22. Environmental groups need also to promote the use of more proactive environmental tools. This requires their active input into planning processes to ensure the proper use of environmental impact assessments (EIA) and audits.

23. A thorough EIA process should not only highlight potential environmental problems but should also be used to generate alternatives to the proposed project. The need and purpose of the proposed project must be questioned to allow alternatives to be considered or, indeed, to propose a no-action alternative.

24. Furthermore, emissions registers provide no information on energy use, or the volume and speed of material flows in production-consumption systems. Ultimately, mass balance accounting of both materials and energy used in production systems must evolve as standard practice.

25. In an effort to quantify national sustainability, some countries have examined their 'carrying capacities' - a measure used to assess the optimum population that an ecosystem can sustain without loss of structure or stability. Mass balance accounting at local, regional and national level - and ultimately internationally - can enable society to gauge its progress towards sustainability.

E. Public Education to spearhead change

26. The Clean Production (CP) approach has yet to be widely implemented. The hurdle is not a lack of physical or technical capability, but the lack of industrial and political will to implement CP methods. This inertia is due to the absence of public pressure. Governments and industry will only act if they are informed about the choices available to them and feel some pressure from society.

27. Today, the CP dialogue and development is taking place within a tight circle of engineers and academics. The development of radical CP ideas is happening outside the formal international network. For example, much of the development of tree-free paper, alternative building materials and energy devices is coming from small public groups.

28. There needs to be more information on the alternatives available. This requires not only highlighting cleaner technologies and products on a case-by-case basis, but also promoting clear legislative and economic strategies to underpin a more widescale change. Examples of strategies which are being discussed in some West European countries include extended producer responsibility (EPR) also known as 'take-back' and the concept of economic tax reform (ETR).

29. EPR imposes an obligation on the producers of goods to take back their used products at the end of their useful life. The objective of ETR is to correct the distortions in current taxation systems which favour taxing labour instead of resources. This would shift taxes from

labour by reducing, for example, income tax and introducing taxes on energy and environmentally destructive materials or products. Both instruments would complement each other, resulting in less use of resources through better product design and more use of labour in the dismantling, re-use and repair of products, thus cutting unemployment.

30. This can only be achieved if these instruments are correctly designed and implemented. Environmental groups must monitor and influence these developments.

F. Greenpeace proposes Ecological Tax Reform

31. Political support for "eco-tax reform" (ETR) came from all parties in the 1995 German elections. The German debate on tax reform was provoked by a study prepared by the influential German Economic Research Institute (DIW) and commissioned by Greenpeace. The study showed that a unilateral ETR programme that raised energy prices by 7 per cent per year for 15 years, and recycled the revenues to industry and households, would not damage competitiveness. At the same time, it would cut energy consumption by 21 per cent, create over half a million jobs and favour the poor over the rich. However, opposition from heavy energy users in German industry has blocked progress so far.

32. Austria, where Greenpeace commissioned the same institute to examine the opportunities for ETR there, is looking to introduce energy taxes next year; Sweden, Denmark and Switzerland are also planning to extend the use of eco-taxes, on energy, and on toxic products such as solvents and pesticides.

33. Environmental groups needs to track this progress and share information both with each other and with the wider public.

G. The Greenfreeze Campaign

34. "The beauty of greenfreeze is that anyone can have the technology. It is not patented. It cannot be patented because all we have done is find the right mix of two existing common gases... The irony is that the chemical industry also searched for a substitute to CFCs but only in one direction - to find substances they could patent"

-- Scientist at Dortmund Institute of Hygiene who developed a prototype greenfreeze, 1990

35. Another way in which Greenpeace has contributed to spearheading cleaner production is in the development and promotion of the greenfreeze - a fridge which uses neither ozone-depleting CFCs and HCFCs nor the global warming chemical HFC. The fridge uses a mixture of relatively benign hydrocarbons: butane and propane - used widely in refrigeration before the advent of CFCs in the 1930s. Greenfreeze is a development beyond environmental protest which illustrates how environmental groups can campaign to change the markets for products.

36. The greenfreeze campaign is a story of an alternative technology which governments ignored and industry tried to stop. Without the action of Greenpeace, the world would be on

a different course, heading for a future in which millions of consumers and businesses would be using chemicals which destroy the ozone layer (HCFCs) and which cause global warming (HFCs).

37. Greenfreeze shows how it is possible for an environmental group to take a new form of direct action, one which harnesses the expertise of technologists to the political and market power of consumers to force change where conventional campaigning is not enough. Before greenfreeze, government policies all over the world were locked in the grip of the chemical industry. The same industry which created CFCs was dictating HCFCs and then HFCs as the 'solution' to the problem.

38. Within two years over half of all Western European refrigerator production was using greenfreeze technology. Greenpeace also campaigned in Latin America, India and China. The first Chinese greenfreeze was due to roll off the production line in February 1995 at Qingdao's factory, a major Chinese fridge producer.

39. The greenfreeze campaign shows that genuine change is possible, and that even powerful industrial strangleholds can be broken.

H. Campaigning for a Chlorine-free planet

40. The elimination of chlorine use is another Greenpeace campaign goal. Chlorine is a poisonous gas used in many different industrial sectors creating environmental and health hazards throughout its entire life cycle. It is used in the production of an enormous class of some 11,000 organochlorine chemicals - from pesticides to solvents and bleaching agents - most of which are toxic, persistent and bioaccumulative.

41. The first stage of the campaign has been the stigmatisation of chlorine to raise public awareness of its hazards. The second stage is to force the change to alternative chlorine-free technologies and products.

42. To highlight the alternatives to chlorine bleaching in the pulp and paper industry, Greenpeace released a chlorine-free version of the popular German magazine 'Der Spiegel'. Today Soedra Cell, a Swedish company which owns six pulp mills in Sweden is committed to going totally chlorine free by 1996.

43. Greenpeace is now targetting the dry cleaning and PVC industry. Several different types of 'wet cleaning' are available as alternatives to perchloroethylene-based dry cleaning. As for PVC, the chlorine industry sees PVC as the "sink" for excess chlorine due to the drop in its demand in other sectors. Alternatives to all current uses of PVC exist.

44. The chlor-alkali industry clearly recognises the move away from the use of chlorine. Today it is striving to protect its markets and capital by waging a public relations war, fighting further regulation, and expanding markets where environmental regulations and enforcement are less stringent, public awareness is low and the economies are weak.

II. INTERNATIONAL NGO NETWORKING

45. The globalisation of trade and investment, as the case of chlorine industry migration demonstrates, demands increased international NGO networking. The uneven progress in the development and enforcement of environmental standards throughout the world provides an outright inducement for the transfer of harmful technologies and products.

46. The situation in countries with economies in transition is typical of that in most developing countries who are opening up to foreign trade and investment. The type of development being foisted on the non-OECD world is the misguided Western resource-intensive model. Networking between Western NGOs with those in countries receiving the inappropriate investment can alert the public and stop such proposals from going ahead. NGOs in the non-OECD need to point to traditional, often more environmentally sustainable practices in their countries.

47. NGOs in the developed countries need to expose the double standards of TNCs (transnational corporations) and the use of public funds by MDBs (multilateral development banks) or in bilateral aid programmes to finance such investment. International NGO networking can use the power of information exchange to inform their public, decision-makers and financing institutions of alternative cleaner technologies and strategies being developed by western governments to move towards clean production.

A. Greenpeace campaigns in Central and Eastern Europe

48. The Greenpeace toxic trade campaign in Central and Eastern Europe (CEE) illustrates the way that international NGO networking has been exposing dirty trade and investment and promoting the opportunities for clean production.

49. Greenpeace believes that the situation in CEE provides an immense and unique opportunity for the region to "leapfrog" the West by implementing only the most successful global environmental strategies, including cleaner production, and avoiding those that are clearly failing in the West.

50. New investment ventures in CEE offer opportunities for unprecedented democratic participation in investment decisions, and industrial and agricultural restructuring allow for a transition to Clean Production methods.

51. However, this new climate also presents causes for concern. The dangers include:

(a) The transfer of industrial and nuclear technologies, services and products which have been rejected and may soon be phased out in the West. These may be rationalised by both the need for economic growth and the argument that they may be better than that which now exists;

(b) The region becoming a resource bank to feed the West's wasteful consumption patterns;

(c) The adoption of reactive pollution "control" technologies rather than preventing pollution at source using cleaner production methods.

B. Waste Trade

52. In 1990 Greenpeace released a report "Poland: The Waste Invasion", exposing the trade in waste from Western Europe, mainly Germany, to Poland. This resulted in Poland strengthening and enforcing a waste import ban. Further reports, press conferences and "return to sender" actions in other countries of the region resulted in national waste import bans.

53. At the same time, Greenpeace was lobbying Governments and highlighting the issue in countries exporting waste. Besides being immoral - and often illegal - waste exports from developed, waste-intensive countries are one of the biggest obstacles to the introduction of cleaner technologies by reducing their waste disposal costs and removing any incentive to prevent waste generation.

54. After seven years of Greenpeace campaigning worldwide, the Basel Convention finally banned waste exports destined for dumping from OECD to non-OECD countries in 1994, and a ban on waste exports for recycling is to come into force in 1998. The Basel Convention also commits parties to the convention to co-operate internationally on the development of low-waste technologies.

C. Providing Remedies

55. In 1991 at a conference on the environment, industry and investment in CEE, Greenpeace was already warning the countries of CEE of the threats that foreign trade and investment can pose[1]. Two years later, Greenpeace released a report in Poland entitled "Open Borders: Broken Promises" presenting a set of model contractual clauses to encourage clean investment, by ensuring public disclosure and participation in the privatisation process - particularly in the sale of State-owned enterprises.

56. In 1994, on the eve of UNEP's Cleaner Production Seminar in Warsaw, Greenpeace released a report entitled "Poland: The Green Tiger of Europe? Clean Production - The Only Way Forward". The report presented the opportunities for moving toward Clean Production offered by economic, legislative, political and industrial restructuring and described cleaner production programmes and local initiatives in Poland.

57. The "Green Tiger" report also examined foreign aid and investment to Poland. It highlighted some of the best examples of environmental sector aid projects, and gave examples of the some of the worst, expensive end-of-pipe technologies being imported. In particular, the report criticised flue gas desulphurisation and waste incineration, both of which attempt to treat pollution after it has already been generated and often create more problems than they solve. The case study of the waste incineration campaign presented later describes how international NGO networking has succeeded in stigmatising this technology.

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[1] "Avoiding Western Mistakes: A Guide to Clean Investment in Central and Eastern Europe" Greenpeace, Budapest, November 1991

58. The report recommends that Western investment should support the region's positive environmental traditions - instead of undermining them. These traditions include an efficient public transport system and effective re-use and recycling policies. The transfer of the misguided Western model of development places an over-emphasis on pollution control over pollution prevention, roads over railways, chemical intensive agriculture over organic systems and disposable over re-useable packaging.

59. The Polish government has declared 1995 to be the Year of "Cleaner Production".

D. The Waste Incineration Campaign - A Case Study in global NGO Networking

Networking: North America - Western Europe

60. Public opposition to waste incineration has proved to be one of the biggest incentives to pollution prevention by rejecting this end-of-pipe treatment technology as a final solution to waste generation.

61. The grassroots movement to oppose waste incineration started in the 1970s in North America as awareness of the dangers of incineration became evident. This movement was fuelled in part by the issue of environmental justice, since a high proportion of toxic dumps, incinerators and hazardous industries were sited in poor, non-white communities.

62. Increased awareness of health problems from incinerator emissions has strengthened this resistance. Communities living downwind from incinerators were found to have a higher incidence of eye irritations, emphysema, pneumonia, asthma, allergies and neurologic symptoms. Cattle have died from direct exposure to a pharmaceutical incinerator in Ireland. These are the observable effects -- the chronic and reproductive effects of dioxin and heavy metal emissions from incinerators are more insidious.

63. Similarly the effects of incineration at sea - a disposal route for industrial, chemical waste used between 1969 and 1991 - raised concerns about effects on the ocean microlayer, as well as recognition that this was a disincentive to industrial waste reduction.

64. Greenpeace started a campaign against this in 1982. The campaign's three objectives were to:

(a) stop the use of the world's oceans for dumping industrial, chemical waste;

(b) target toxic waste generation as the source of the waste crisis and its elimination as the only solution;

(c) block the spread of another polluting disposal technology which results in the perpetuation and legitimisation of wasteful and hazardous industrial practices.

65. By 1986 a U.S. coalition of politicians and public groups succeeded in getting ocean incineration banned. This provided the necessary fuel to fire the campaign in Europe. In 1985, 1986 and 1987 Greenpeace published several critiques on ocean incineration, highlighting the fact that ocean incineration discouraged the development of waste reduction technologies and that its availability perpetuated waste generation.

66. The dissemination of this information, and Greenpeace actions aimed at forcing incinerator ships back to port, served to expand the network opposing ocean incineration. Environmental groups were joined by the National Union of Seamen in the UK and the National Federation of Fishers in Denmark as well as local communities in England and the Netherlands who successfully defeated proposed expansions of port storage facilities for hazardous waste destined for ocean incineration. A new European network was born. Finally the Second International Conference on the Protection of the North Sea agreed to end ocean incineration by 1995. The practice actually stopped in 1991.

67. The opposition to land incineration has resulted in the defeat of numerous incinerator proposals and the introduction of moratoria on the construction of new facilities, particularly in Western Europe and North America.

Networking: North - South

68. The success of this campaign in the West must not result in waste incineration technology moving South and East. Western NGOs bear a responsibility toward their eastern counterparts in alerting them to the threats, providing information and supporting them in their campaigns for Clean Production.

69. Western companies promoting and selling incineration technologies are today aggressively seeking new markets. Ideal candidates are those communities already burdened with historical waste, where environmental awareness is low, democratic structures are fragile and the economy is weak.

70. The countries of CEE fulfil all of these criteria. When the borders to the West were opened in 1989/90, western waste and incinerators were some of the first "commodities" to be offered. Although most CEE countries now have waste import bans, the threat of widespread transfer of incineration technology to the region remains.

71. Investment in waste incineration follows the pattern of other end-of-pipe, so-called "environmental" technologies. Because waste incineration is considered to be an "environmental industry" it qualifies for international assistance.

72. The transfer of misguided concepts and strategies tends to precede the transfer of inappropriate technology. The industry's entrance into CEE is the culmination of a three-stage process of exporting toxic industrial development:

- first, economic "development" is exported through free trade policies and financing by multilateral and bilateral agencies;

- secondly, environmental regulations to control the excesses of this development are introduced;

- finally, "environmental" technology and services are exported to service these regulations.

73. In this way, regressive and toxic technology is being thrust on these countries, assisted in many cases by Western government funding and proposed by their domestic companies. At the same time, foreign consultants, often paid out of so-called aid money, advise the region's governments on environmental policy that favours **waste management**, including incineration, over **waste prevention** through clean production.

74. For example, Greenpeace has yet to hear Danish waste consultants recommending that CEE countries ban the use of aluminium cans as their government has done at home. Instead of promoting waste reduction strategies, Danish 'experts' recommend various waste management technologies, including waste incineration.

75. Today there is a global coalition of NGOs fighting incineration with strong regional networks in CEE and Latin America. In Poland, the Waste Prevention Association has released a report entitled "Western Pyromania Moves East" which details 170 proposals to import waste incinerators to countries with economies in transition. The report not only provides information about alternative waste disposal technologies but also describes case studies of Polish factories which have changed their industrial processes to prevent or reduce incinerable waste streams.

III. WORKING WITH NATIONAL AND INTERNATIONAL INSTITUTIONS

76. While political and market pressures alone can bring about industrial change in a given country or region, clearly that is not enough to bring global change. The globalisation of trade demands international coordination at an inter-governmental level. Banned technologies and products, phased out or stigmatised in one country, should not be transferred elsewhere.

77. The task of international and national governmental organisations is to support environmental NGOs by creating a level international playing field. Urgent global action is necessary in a number of key environmental issues including: environmental liability, the transfer of hazardous technologies and products, common standards on EIAs and audits - to name but a few. International agreements could also secure for the public the right to look into investment decisions via steps in the investment screening process, to allow for public scrutiny.

78. EU attempts at harmonisation of standards and enforcement practices could provide a model, if the Commission, bowing both to national government and industry lobbying pressures, did not stoop to the lowest common denominator.

79. International commitments on their own, are not enough. Enforcement must follow. The Greenpeace waste trade campaign alerted the public to this scandalous trade and succeeded in getting individual non-OECD governments to implement waste import bans. However it was the Basel Convention that finally banned this practice worldwide. But who will police this ban?

80. The Montreal Protocol in committing governments to phasing out ozone-destroying CFCs opened up the search for alternatives. The vested interests of the chemical industry

attempted to steer this search in the direction of patentable alternatives. International conventions should not only provide commitments to phase-outs, but also point to acceptable alternatives, and blacklist others.

81. The International Ministerial North Sea Conference in June 1995 declared that parties should strive to achieve close to zero concentrations of all man-made synthetic substances in the North Sea within one generation (25 years). Who will monitor the progress towards this laudable goal?

82. International conventions have an important role to play in getting global agreements. However, unless some form of an international eco-police force is created to monitor compliance, these global commitments become meaningless.

83. Another urgent need identified by many non-OECD governments is for an up-to-date databank of cleaner technologies. Although UNEP's Industry and Environment Programme has a Cleaner Production database, much of the information is old and none of the technologies are vetted by independent assessors. What is required is an international databank of industrial innovations, regularly updated and all information checked by independent experts. Such a databank could be compiled by universities. It could be part of a larger institution, staffed by engineers and other experts, which provides information on cleaner production, tracks foreign investment and provides free advice to non-OECD governments.

IV. CONCLUSIONS

84. "Pollution Control always costs money; Pollution Prevention always saves money"
-- motto of the Cleaner Production programme in Poland

85. Opportunities for cleaner production exist worldwide. Many of the more progressive advances such as technological innovations, product re-design, creative policies and strategies are taking place in the Western world.

86. However a major obstacle to their widespread use and implementation is industry's need to amortise existing pollution control investments. Once a factory invests in a waste-to-energy incinerator, it has little incentive to reduce waste. The vested interests of the enormous "environment industry" - from waste management to pollution control equipment - are another negative force, although these barriers may be overcome with the widespread introduction of eco-taxes and take-back laws.

87. The so-called developing world and the former eastern bloc do not yet have these prime disincentives to cleaner production. Even though Western "aid" is funding some investment in end-of-pipe technologies and encouraging national governments to do likewise, finance is limited - so limited, that their only real choice is pollution prevention. After all, pollution is wasted resources. The Third World cannot afford to go the route of the Western one.

88. In CEE, cleaner production projects repeatedly demonstrate that pollution prevention saves money. In Poland the four year experience shows that 20-25% reductions in emissions

are possible with little or no money. Improvements in housekeeping and the installation of in-house recycling and recovery systems are the most common cleaner production measures. The skilled workforce in the CEE countries makes opportunities for Clean Production there particularly bright.

89. For cleaner production to progress beyond housekeeping and process change, the 'developing' world must have access to international databanks. Global networks between academics from all disciplines must be strengthened. It is also important that scarce domestic funds in the South are not sunk into expensive, pollution control and other obsolete investments, diverting capital away from cleaner ones.

90. Another factor crucial to cleaner production is democracy. The regions where there is rapid investment, and some democracy, offer the best scope for cleaner production. Trade unions and occupational health and safety authorities need to become more proactive in promoting cleaner production. Preventing the hazard at source eliminates the danger. Many cleaner production projects have shown shop floor employees, who are closest to the production, to have contributed some of the most creative innovations.

91. A global approach to tackling environmental problems offers every country the opportunity to introduce cleaner production. A level environmental playing field reduces the threat of inappropriate or obsolete investments.

V. RECOMMENDATIONS

All policy makers must actualise the Precautionary Principle by developing strategies and policies for cleaner production which actively integrate public participation.

Governments must facilitate full and detailed public access to information about industrial emissions, waste transfers and product development. The international Pollutant Release and Transfer Register must detail all chemical use and mass balance audits to enable a fully informed dialogue between communities, government and industry

Governments must introduce economic and legislative policies to encourage cleaner production initiatives.

Every industrial facility should undertake a mass balance audit to identify production inefficiencies and opportunities for cleaner production. Technical advice for SMEs to undertake this work should be government-funded. Results of the audits should be made public.

An international body should draw up a list of technologies and products that need to be phased out globally.

An international body of independent academics should prepare a database of cleaner production alternatives to hazardous technologies and products.

An international eco-police needs to be established to monitor implementation of international agreements.

Funding must be made available to NGOs and community groups who actively promote cleaner production alternatives.

International networking between NGOs must be facilitated. It is the most cost effective information dissemination tool that can deliver real change.

Annex I

CLEAN PRODUCTION DEFINITION AND CRITERIA

Clean Production systems for food and manufactured products are:

- non toxic;
- energy efficient;
- made from renewable materials which are routinely replenished and extracted in a manner that maintains the viability of the ecosystem and community from which they were taken, or;
- made from non-renewable materials previously extracted but able to be reprocessed in an energy efficient and non-toxic manner;

Furthermore, products are:

- durable and reusable;
- easy to dismantle, repair and rebuild;
- minimally and appropriately packaged for distribution using reusable or recycled and recyclable materials.

Above all, Clean Production systems

- are non-polluting throughout their entire life cycle;
- preserve diversity in nature and culture;
- support the ability of future generations to meet their needs.

The life cycle includes:

- The product/technology design phase;
- The raw material selection and production phase;
- The product manufacture and assemblage phase;
- The consumer use of the product phase;
- The societal management of the materials at the end of the useful life of the product.

Annex II

TERMINOLOGY

UNEP's Cleaner Production programme has agreed the following definition:

"**Cleaner production** is the conceptual and procedural approach to production that demands that all phases of the life-cy le of a product or process should be addressed with the objective of prevention or minimisation of short and long-term risks to humans and the environment. A total societal commitment is required for effecting this comprehensive approach to achieving the goal of sustainable societies".

Strategies which are going some way towards Clean Production, are variously referred to as:

* waste minimisation;
* waste reduction;
* waste prevention/pollution prevention;
* low- and non-waste technology;
* cleaner technology;
* clean/cleaner production.

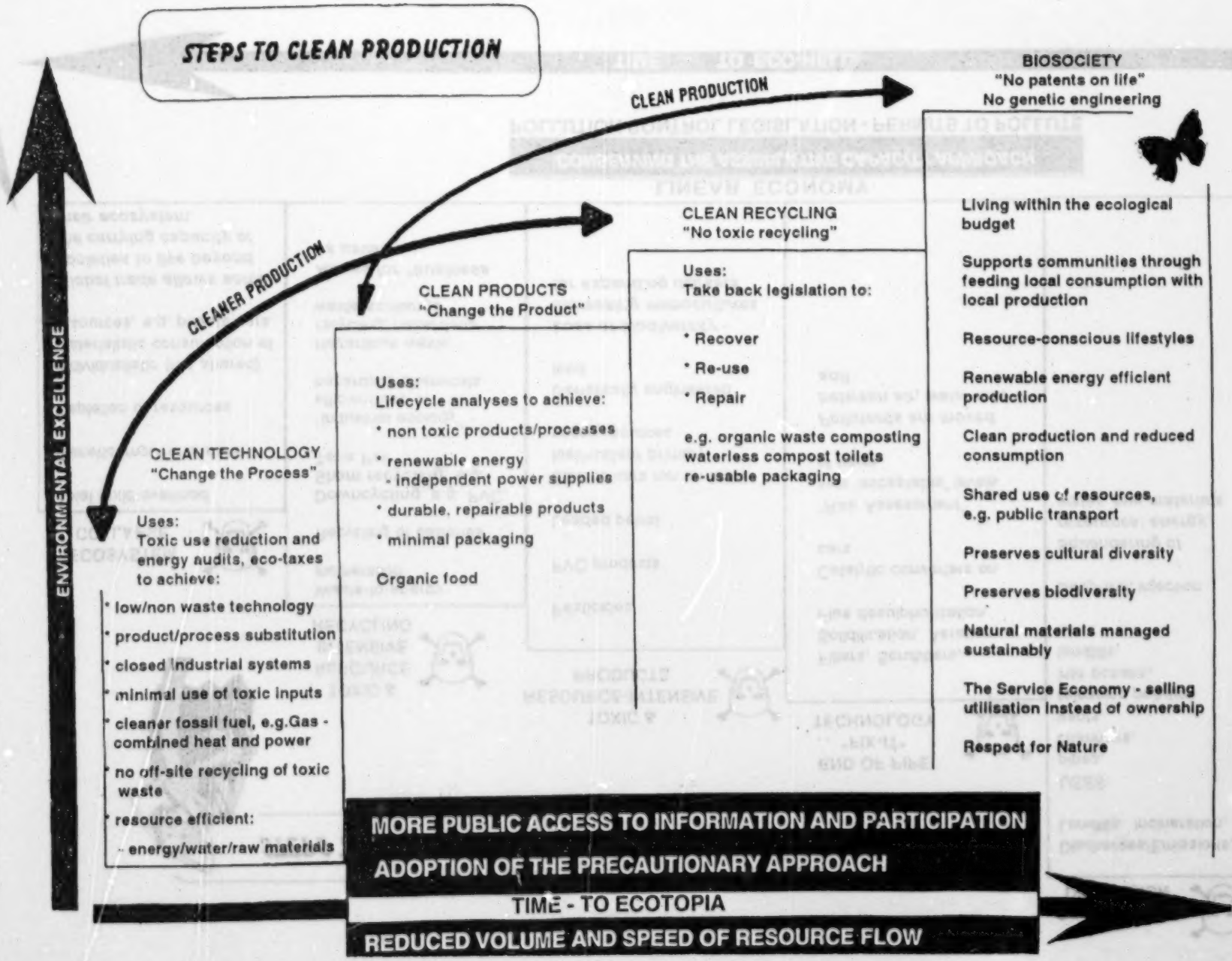
All these strategies have the common characteristic that they are not diluting/dispersing pollution, nor are they end-of-pipe in concentrating it and then transferring it to another environmental medium eg. from air to soil and groundwater.

UNEP has adopted the term "cleaner production" because they believe progress is relative and to emphasise the pragmatic nature of feasible alternatives that exist now.

Greenpeace and others use the term "clean production" because the ultimate goal and criteria are clearly defined. The definition also recognises the need to protect biodiversity and community viability since many of the substitutes being developed for current toxic chemical use could be genetically manipulated bio-based material. This must not be allowed to happen.

Annex III

BIOSOCIETY
CLEAN RECYCLING
CLEAN PRODUCTS
CLEAN TECHNOLOGY
THE PARADIGM SHIFT
DILUTION AND DISPERSION
END OF PIPE TECHNOLOGY
TOXIC & RESOURCE INTENSIVE PRODUCTS
TOXIC & RESOURCE INTENSIVE RECYCLING
ECOSYSTEM COLLAPSE
TO ECOTOPIA
TO ENVIRONMENTAL HELL
WHERE DOES YOUR COUNTRY STAND?


STEPS TO CLEAN PRODUCTION
ENVIRONMENTAL EXCELLENCE
CLEANER PRODUCTION
CLEAN PRODUCTION
CLEAN TECHNOLOGY
"Change the Process"
Uses:
Toxic use reduction and energy audits, eco-taxes to achieve:
* low/non waste technology
* product/process substitution
* closed industrial systems
* minimal use of toxic inputs
* cleaner fossil fuel, e.g.Gas - combined heat and power
* no off-site recycling of toxic waste
* resource efficient:
- energy/water/raw materials
CLEAN PRODUCTS
"Change the Product"
Uses:
Lifecycle analyses to achieve:
* non toxic products/processes
* renewable energy
- independent power supplies
* durable, repairable products
* minimal packaging
Organic food
CLEAN RECYCLING
"No toxic recycling"
Uses:
Take back legislation to:
* Recover
* Re-use
* Repair
e.g. organic waste composting
waterless compost toilets
re-usable packaging
BIOSOCIETY
"No patents on life"
No genetic engineering
Living within the ecological budget
Supports communities through feeding local consumption with local production
Resource-conscious lifestyles
Renewable energy efficient production
Clean production and reduced consumption
Shared use of resources, e.g. public transport
Preserves cultural diversity
Preserves biodiversity
Natural materials managed sustainably
The Service Economy - selling utilisation instead of ownership
Respect for Nature
MORE PUBLIC ACCESS TO INFORMATION AND PARTICIPATION
ADOPTION OF THE PRECAUTIONARY APPROACH
TIME - TO ECOTOPIA
REDUCED VOLUME AND SPEED OF RESOURCE FLOW

STEPS TO ECO-HELL

DEGREE OF ENVIRONMENTAL HELL

ECOSYSTEM COLLAPSE	TOXIC & RESOURCE INTENSIVE RECYCLING	TOXIC & RESOURCE-INTENSIVE PRODUCTS	END OF PIPE "FIX-IT" TECHNOLOGY	DILUTION AND DISPERSION
Total toxic overload	Waste-to-energy incineration	Pesticides	Filters, Scrubbers, Solidification, Aeration, Flue desulphurisation	Discharges/Emissions, Landfills, Incineration,
Genetic impoverishment	Recycling of batteries	PVC products	Catalytic converters on cars	*USES:* pipes, chimneys, vents, releasing pollution into oceans, landfills, air ...
Depletion of resources	Downcycling, e.g. PVC, Sham recycling, e.g. Tetra Pak	Leaded petrol	"Risk Assessment" sets "acceptable" levels of harm	Deep-well injection
Individualistic (not shared) materialistic consumption of resources, e.g. private cars.	"Industrial ecology" - efficient use of hazardous chemicals	Electric cars run on fossil fuel/nuclear primary energy sources	***Pollutants are moved between air, water and soil***	***Squandering of resources: energy, water, raw materials***
Global trade allows some societies to live beyond the carrying capacity of their ecosystem.	Hazardous waste recycling, hazardous waste exchange	Genetically engineered food		
	Allows for "business as usual"	***Loss of biodiversity - increasing monocultures for expanding markets***		

LINEAR ECONOMY

CONSERVING THE ASSIMILATIVE CAPACITY APPROACH

POLLUTION CONTROL LEGISLATION - PERMITS TO POLLUTE

TIME ... TO ECO-HELL